

# TECHNICAL SPECIFICATIONS



## **ALLOWANCES**

### **Unforeseen Conditions (Change Orders): Not to exceed \$25,000**

Contingency Fund for Change Orders in regards to unforeseen conditions and changes to Scope of Work required to complete the work originally intended in an acceptable manner. See Change Orders (90-03).

## **BID SUBMITTAL REQUIREMENTS**

- ☐ Sample of MRS M Commercial Warranty
- ☐ Letter from MRS M attesting that the Contractor is an authorized roofing contractor of the prescribed roofing material in good standing.

## **DEFINITIONS**

MRS M: Membrane Roof System Manufacturer

Owner / Owner's Representative: Gila County Facility Services Project Manager

## **REFERENCES**

ASTM D6754 Standard Specification for Ketone Ethylene Ester Based Sheet Roofing

ASTM D 751 Test methods for Coated Fabrics

Seaman Corporation / FiberTite General Guide Specification FTR GS04/08

UL 790 Underwriters Laboratories (UL) – Fire hazard Classifications

FM 4470 GM Global (FM) – Roof Assembly Classifications

National Roofing Contractors Association (NRCA) – Roofing and Waterproofing manual

## **DEMOLITION**

As required at existing roof surfaces to provide a weather and watertight warranted roofing system.

Contractor to restore or repair any damaged floors, walls, ceilings, sidewalks, curbs, utilities, etc. damaged by the contractor, or his subcontractors, during construction. The Owner shall review repair work, with the Contractor, and approve, prior to final acceptance and payment.

## **ROOFING**

### **Requirements:**

Furnish and install a new weather and watertight High Performance KEE Thermoplastic Roofing system using an Adhered FiberTite-XT FB 050 membrane, approximately 22,000 sq.ft.

This specification is constructed around FiberTite Roofing Systems and Seaman Corporation's General Guide Specification as the standard of performance and quality, and shall be considered part of these specifications.

### **Performance Requirements:**

**General:** Completed high performance membrane roof system and base flashing shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation or other defects in construction.

**Material Compatibility:** Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by the MRS M based upon insitu field evidence of the roofing membrane / systems service life cycle greater than 20 years.

**Roofing System:** Provide high performance membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist wind uplift pressure calculated according to ASCE-7.

**Energy:** Provide high performance membrane roofing system, Energy Star qualified, and has an initial Solar Reflective Index equal to or greater than 78.

**If a condition is discovered that is not covered by the project or manufacturer's specifications, notify the Owner immediately. Take appropriate steps to prevent water intrusion into the roof system until such conflict is resolved and roofing operations are continued.**

### **Project Scope:**

Roofing Contractor shall furnish all labor, materials, tools, equipment, supervision and permits necessary to install a new High Performance Adhered FiberTite-XT FB 050 over existing roofing system: including any related insulation, cover-boards, flashings, accessories and related metalwork in strict accordance with the **contract and High Performance Membrane Roof System Manufacturer's** most current specifications and details.

The contractor shall examine all areas and conditions for the work, prior to bidding and confirm all given information. The Contractor shall notify the Owner in writing, prior to bid, of any conflicts that will affect the quality or cost of the proposal.

**Any contractor wishing to submit a proposal using an alternative "High Performance" roofing system other than that specified, must submit a Substitution Request for preapproval 2 weeks prior to bid date.**

All components, including roof insulation and/or cover-board, fasteners, adhesives and other accessories shall be manufactured or supplied by the approved MRS M.

Contractor shall maintain an adequate number of skilled workers who are thoroughly trained and experienced in the necessary crafts, and who are completely familiar with the specified requirements and methods necessary for the proper performance of the work. No allowance will be made for lack of skill on the part of the workers.

The Contractor is responsible for providing a suitable substrate surface for the proper installation of the Membrane Roofing System, and MRSB specified components for a complete weather and watertight roofing system.

Installer must examine the substrate and conditions under which the roofing is to be installed, and notify the Owner, in writing, of conditions detrimental to the proper and timely completion of the work, not visible during the mandatory pre-bid walk-through. **Commencement of roofing operation indicates the contractor's acceptance of the roofing substrate for roof application.**

#### **Quality Control / Inspections:**

Contractor shall initiate and maintain a QC program to supervise and inspect the quality of the application on a daily basis. Supervisor to probe all heat welds incorporated within the membrane Roofing System. If inconsistencies in the quality of the application of the composite, membrane and/or welds are found, all work shall cease until corrective actions are taken to ensure the continuity of the installation.

Excessive patching of field seams because of inexperience or poor workmanship will not be accepted at time of final inspection for warranty acceptance. T-JOINT Patches as required by the membrane manufacture are permitted.

QC program shall ensure that all aspects of the installation (sheet layout, attachment, welding, flashing, details are in strict accordance with the most current MRSB Specifications and Details.

#### **Coordination:**

**A pre bid meeting will be held to walk the project and familiarize all bidders with the project.**

See Meetings, Special Provisions, in General Provisions of the Invitation to Bid, for Preconstruction and Construction meeting requirements.

#### **Protection:**

It shall be the contractor's responsibility to protect all surfaces that may be subject to any damages during installation of roofing system. Any items damaged shall be replaced in original condition. The Contractor will be responsible for all damages.

Provide proper protection on all newly completed roofing to avoid damage to the new roofing system. Traffic should be minimized on a freshly laid roof.

Daily production shall be limited to only that which can be made 100% watertight at the end of the day, including all flashing and night seals.

**Qualifications:**

Manufacturer: The High Performance Membrane Manufacturer shall be an American owned company with no less than 25-years experience as a commercial roofing manufacturer.

Installer: All contractors that bid this work, shall be licensed and have a minimum of not less than 5 years installation experience, similar to the size and scope contained in the project. Contractor shall be an **“Authorized Roofing Contractor” of the MRS M in good standing and be fully knowledgeable of all the requirements within the contract documents as well as all job site conditions that could affect their work.**

**Warranty:**

Upon completion of the roof installation, the contractor shall arrange for a quality assurance / warranty inspection by the Technical Service Department of the approved MRS M. Notice of inspection date and time shall be given to the Owner at least 72 hours prior to the inspection taking place.

Provide a minimum 20 year full warranty covering leaks caused by material defects and/or installation workmanship for a period of 2 years. In addition, the warranty shall cover the repair and/or replacement of any materials and/or equipment damaged from such leaks. An additional warranty document shall be issued for hail damage from hail up to 1.5 inches diameter.

**Product Data:****FiberTite Membrane: FiberTite-XT50 FB**

Nominal 50-mil ketone ethylene ester (KEE) membrane, reinforced with a 6.5 oz yd<sup>2</sup> knitted polyester fabric with a 4-oz yd<sup>2</sup> non-woven polyester fabric heat bonded to the backside, as manufactured by Seaman Corporation, under the trade name FiberTite-XT50 FB, conforming to the physical properties as outlined.

Color: DC196 Off-White

**Physical Properties:**

Thickness: 1.27mm (.050”) nom.

Thickness over Fiber: .38mm (.015”) Optical Method

Breaking Strength N: 1779 N (400lbf)  
(ASTM D 751 proc. B-strip)

Elongated at Break: 18%  
(ASTM D 751 –strip)

Tear Strength: 556 N (125lbf)  
(ASTM D 751 proc. B. tongue tear)

Linear Dimensional change: .78% max  
(ASTM D 1204)

Fabric Adhesion: No Peel  
(ASTM D 751)

Low Temperature Bend -40 degrees F  
(ASTM D 2136)

Retention of Properties after Heat Aging:  
(ASTM D 3045 – 176 degrees F/156 days)

Breaking Strength Strip: 90% original

Elongation at Break Strip: 90% Original

Low Temperature Bend after Heat Aging: -40 degrees F

Change in Weight after Exposure in Water: 0.0, +3.7

ASTM D471 158 degrees F, 166h, one side only, max %

Factory Seam Strength : >Fabric Strength

(ASTM D 751 Grab method)

Hydrostatic Resistance: 851 psi

(ASTM D 751)

Static Puncture Resistance: PASS

(ASTM D 5602, 99lbf)

Dynamic Puncture Resistance: 30J

(ASTM D 5635)

Accelerated Weathering: 10,000 hr.

(Practice G 155 / xenon , and Practice G 154 / UVA

Cracking or Crazing at 7x magnification: NONE

Fungi Resistance: Discoloration: NONE

Sustained Growth: NONE

(Practice G21, 28 days)

Abrasion Test Cycles: > 2,000

(ASTM D 3389 H-18 wheel / 1,000 g load)

Solar Reflective Index: 98.54 SRI

(Color: DC 196 off white)

Provide materials bearing Underwriters Laboratories marking / label on the packaging or containers indicating materials have been produced under UL classification and follow-up services.

Provide membrane roofing system and materials that have been evaluated by FM Global (FM) for spread of flame, seam leakage, hail resistance and wind uplift. Identify materials with FM Approved marking / label.

Fire/Windstorm classification: FM1-90

Hail resistance: Up to 1.5" in diameter

### **Flashing Membrane:**

DC196 Off-White Nominal 50-mil FiberTite-XT membrane shall be used for all flashing requirements to match the field membrane and warranty expectations selected for the roofing system.

Membrane flashings shall be installed per manufactures recommended details and procedures. See attached details in this document.

### **Wood Nailers:**

Wood nailers shall be installed at perimeter edges for attachment of metal edge. Nailer height shall be equal to coverboard in elevation to create a smooth transition. Wood nailer shall consist of redwood or treated lumber and installed per MRSB.

**Metal Flashing:**

All perimeter edge details are to be fabricated from Polymeric-Clad metal or utilize a prefabricated Fascia System. Install in accordance with MRSMS specifications and details. See attached detail in this document.

**Fasten all metal flashing to wood nailers or approved substrate with approved fasteners 8" O.C.**

**Cover Board:**

Water resistant gypsum core substrate conforming to the following:

FM approved meeting Class A 1-90, for fire and wind.

UL classification: Class A Assembly

Meets requirements of ASTM C473

**½" DensPrime**

**Vapor Retarder: Not Applicable to this assembly**

**Roof Accessories:**

Furnish accessories manufacturer, marketed or approved by the MRSMS, required to complete the roof installation per the manufacturer's specification.

Adhesives and Sealants: Application technique and coverage rates will vary according to substrate and environmental conditions.

Adhesives and Sealants shall be the MRSMS approved product for the condition, exposure and application used.

**Product Delivery, Storage, and Handling:**

**Deliver all materials to the job site in manufacturer's original, unopened containers, with legible labels and in sufficient quantity to all for continuity of work.**

Select and operate material handling equipment in a safe manner, guarding against damage to existing construction or newly applied roofing and conforming to manufacturer's recommendations of handling and storage.

All rolls of membrane shall be stored, lying down, elevated above the roof deck and completely protected from moisture with tarpaulins.

Insulation and cover board materials shall be elevated on pallets and fully protected from moisture with tarpaulins.

**Manufacturer's packaging is not considered adequate for outdoor storage.**



Adhesives and sealants shall be safely stored between 50 degrees F and 80 degrees F, prior to use.

Flammable materials shall be stored in a cool, dry area away from sparks and open flames.

**Follow all precautions as outlined in manufacturer's Material Safety Data sheets.**

Materials, having been determined by the Owner to be damaged, shall be immediately removed from the construction site and replaced at no cost to the Owner.

On site staging and storage of materials **to be determined at pre bid meeting with owner's representative.**

Security of materials and equipment on site is the responsibility of the installing contractor.

### **Safety**

Take all necessary precautions regarding worker health and safety when using solvents adhesives and proximity to fresh air intakes.

Store flammable liquids and materials away from open sparks, flames and extreme heat.

Daily site cleanup shall be performed to minimize debris and hazardous congestion. All construction debris shall be removed from the construction site and legally disposed of in the dumpster provided by Gila County, on site.

**It is the contractor's responsibility to comply with all OSHA, state, federal and local codes, guidelines and safety requirements for construction.**

Fire suppression equipment shall be readily available on the roof top whenever combustible roofing material is being handled. Protect against fire and flame spread at all times.

MSDS Material Safety Data sheets shall be maintained on the jobsite for any and all roofing materials being stored or installed on the project.

### **Substrate Preparation**

Surfaces to receive new membrane roofing shall be free of any standing water, dew, ice, loose debris or any other contaminate that could impair the quality of the installation.

Substrate shall be smooth, clean and free of sharp edges and or projections and obvious depressions that would interfere with the installation of a high quality high performance membrane roofing system. Remove all loose aggregate and debris by power broom and/or vacuum and legally dispose of.

Examine all the areas and conditions where new roofing is to be installed. Correct any and all conditions detrimental to the proper and timely execution of the work. Do not proceed until such conditions have been corrected to the satisfaction of the owner and manufacturer.

Remove and replace all wet or deteriorated insulation and/or wood blocking.



Clean all exposed metal surfaces such as pipes, pipe sleeves, drains, duct work, etc., by removing loose paint, rust and any asphalt or coal tar pitch of any kind. Remove and discard lead sleeves at soil stacks.

**Cut existing EPDM membrane into grid approximately 4'x4'.**

Remove and dispose of all existing pipe, curb and wall flashings.

All deck replacement is to be inspected by owners representative and MRSM representative prior to removal and replacement. Quantities and areas are to be verified and agreed upon by all parties prior to replacement. Daily documentation of deck replacement shall be kept by installer. Documentation shall include square footage of replacement, area on site map replaced and a minimum of 6 photographs of each area replaced, before and after photos. Attachment and deflection deficiencies shall be repaired and brought into compliance with current, local building code requirements.

### **Installation:**

#### **MEMBRANE SECUREMENT USING CR-20**

- A. Un-roll approximately 30 feet of the KEE-FB membrane and position the roll over the properly installed/prepared substrate. Pull the tail back over the roll to expose a workable area (approx. 30") of substrate. (Do not utilize the "butterfly method").
- B. Spray apply a spatter pattern onto roof insulation or coverboard by a spray pattern similar to watering a flower bed. Spatter pattern should yield a heavily textured surface coating of **approximately ¼" to ½" nominal thickness.**
- C. The amount substrate that can be coated with a workable amount of adhesive will be determined by application method, ambient temperature, humidity and available manpower.
- D. To ensure proper application and curing of the adhesive, the outside air temperature shall be 50°F and rising with no chance of dropping below freezing during the subsequent 48 hour time period.
- E. CR-20 bonding range is approximately 1-10 minutes from start of spraying and will vary depending on ambient and substrate temperatures.
- F. The amount of substrate that can be sprayed ahead of the membrane should be monitored to prevent installing membrane in dry adhesive. Care must be taken in high temperatures to insure that the CR-20 has not dried or skinned over prior to embedding the fleeceback membrane.
- G. Broom the adhered portion of the membrane to ensure full contact and complete the bonding process by firmly pressing the bonded membrane into place with a weighted, foam-covered, lawn roller.
- J. Repeat the process for the remaining un-bonded portion of the membrane, lapping subsequent, adjacent rolls of membrane a minimum of 3 inches, ensuring proper shingling of the membrane to shed water along the laps.
- K. No adhesive shall be applied to the lap "seam" areas of the membrane. Areas contaminated with adhesive are difficult to clean, will impair proper welding of the seams and require a membrane patch.
- L. Do not use bad or marginal adhesives.

## HOT AIR WELDING

### A. General

1. All field seams exceeding 10 feet in length shall be welded with an approved automatic welder.
2. All field seams must be clean and dry prior to initiating any field welding.
3. All welding shall be performed only by qualified personnel to ensure the quality and continuity of the weld.

### B. Hand Welding

1. The lap or seam area of the membrane should be intermittently tack welded to hold the membrane in place.
2. Properly hand welded seams shall utilize a 1-1/2 inch wide nozzle, to create a homogeneous weld, a nominal 1-1/2 inches in width.

### C. Automatic Machine Welding

1. Follow all manufacturers' instructions for the safe operation of the automatic welder.
2. Follow local code requirements for electric supply, grounding and surge protection.
3. Properly Automatic Machine welded seams shall utilize a 1-1/2 inch wide nozzle, to create a homogeneous weld, a nominal 1-1/2 inches in width.

Ensure mechanical fasteners do not penetrate items located within or secured to the bottom of the deck: i.e. electrical conduit, post tension cable or other miscellaneous items.

Outside ambient air temperatures must be 40 degree F and rising during the use of any and all adhesives.

#### Coverboard:

Coverboard shall be installed where by the long dimension of the board(s) run in parallel alignment and the short dimensions (end joints) are staggered a minimum of 18 inches.

Coverboard shall be installed with minimum joint dimensions and shall be tightly butted where possible. Maximum joint widths shall be no greater than 1/8". Damaged corners shall be cut out and replaced with an **insulation piece a minimum of 12" x 12" pieces which are cut from larger panels**. Panels smaller than one square foot are not acceptable.

Install no more than can be covered during the same working day. At the end of each working day, provide a 100% watertight cover to avoid moisture penetration where the completed new roofing adjoins the uncovered deck. If water is allowed to enter beneath the newly completed roofing, the affected area(s) shall be removed and replaced at no additional expense to the Owner.

Perimeter areas require a 50% increase in the fastener density. Corner areas require a 100% increase in the fastener density. Fastener installation shall be per the MRSB, and installed using depth sensing tool attachments to ensure proper installation.

**Lightning Protection:** To be installed by a qualified lightning protection installer, working in conjunction with the roofing installer as to not damage, void or compromise the roofing system in any way. All flashing details of lightning protection to be in accordance with MRSM recommended details. See attached detail section of this document.

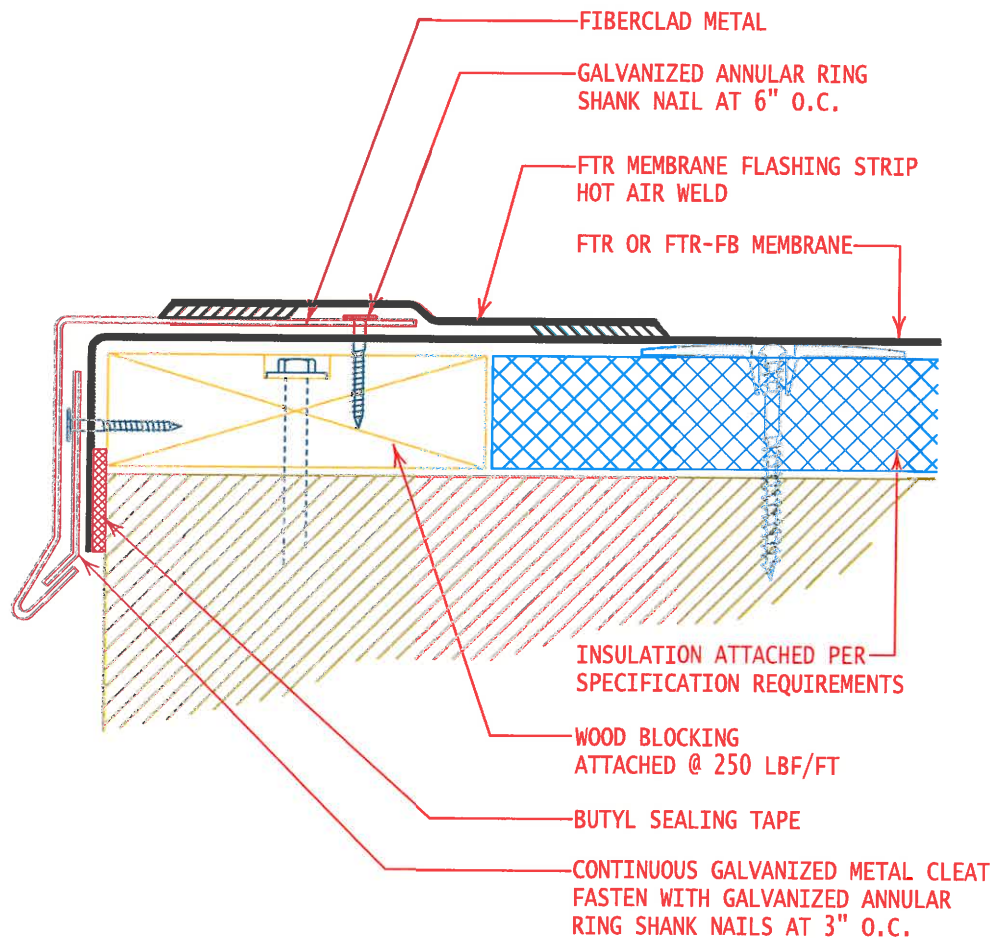
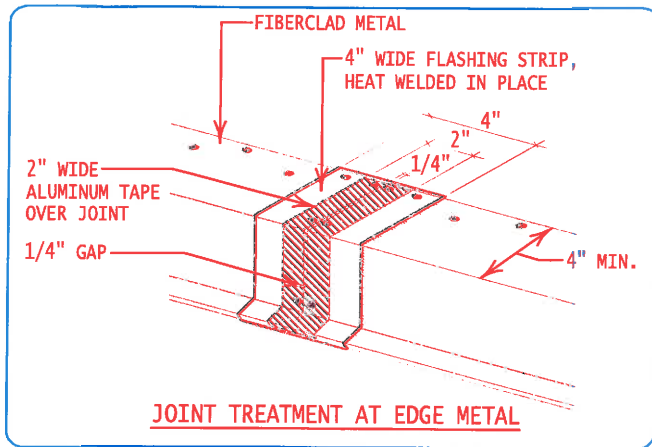
### **Warranty Inspection**

Upon completion of the project, the authorized Contractor shall complete and submit the MRSM Project Completion Notice.

Upon receipt of the notice of completion, a Technical Representative of the MRSM shall schedule an inspection with the Contractor and Owner to thoroughly review the installation and verify compliance with MRSM specifications. Technical Representative to notify roofing contractor and owner's representative 2 weeks prior to final inspection.

Any corrections or modifications necessary for compliance with the specifications and acceptance for warranty (punch list) will be noted on the Final Inspection for Warranty Form.

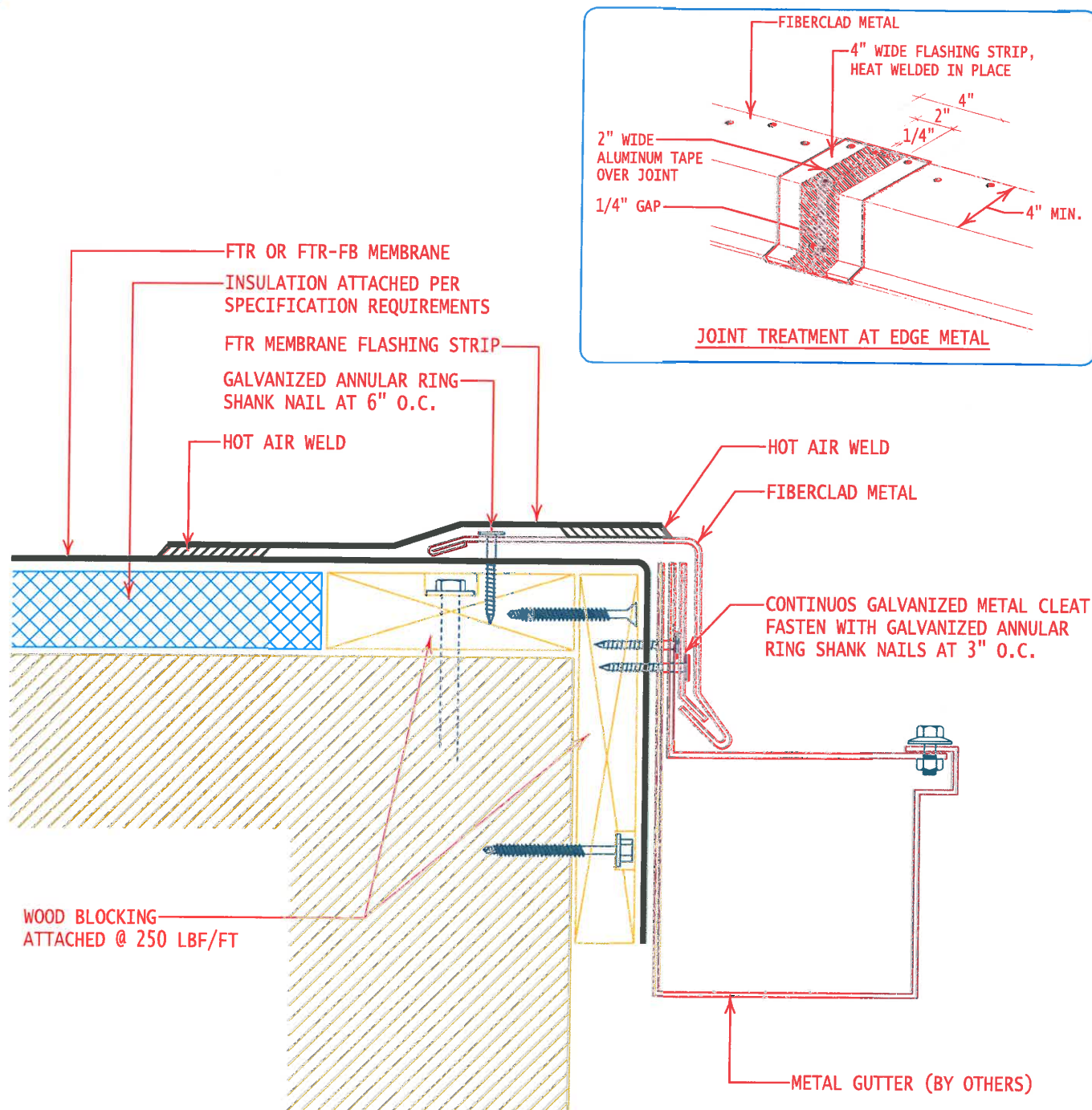
Upon completion of all punch list items and final acceptance of the installation, a warranty as authorized by the MRSM will be issued.



GENERAL REFERENCE:  
"FTR GS06"  
APPLICABLE SYSTEMS:  
"FTR MA06"  
"FTR AD06"

### TYPICAL EDGE FLASHING

REVISES DETAIL	ISSUE DATE	DRAWING NUMBER
ALL PREVIOUS	03-01-07	FTR-DE1



GENERAL REFERENCE:  
"FTR GS06"

APPLICABLE SYSTEMS:  
"FTR MA06"  
"FTR AD06"

## GUTTER FLASHING

REVISES DETAIL

ALL PREVIOUS

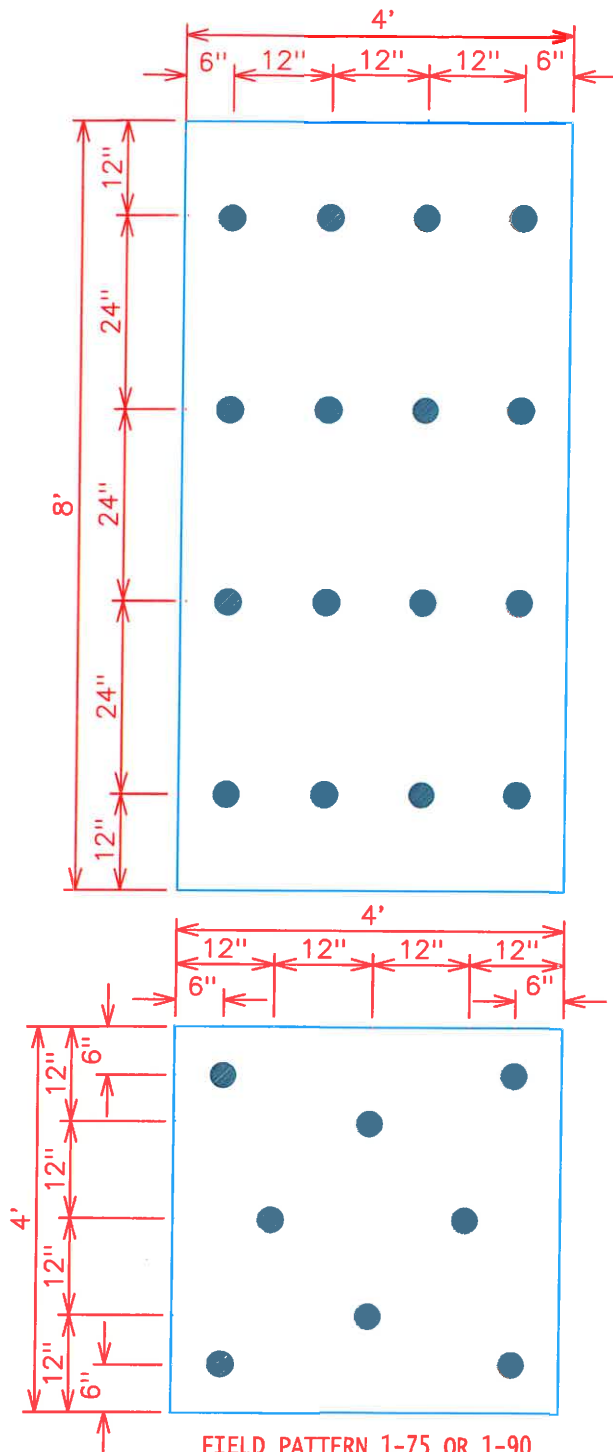
ISSUE DATE

03-01-07

DRAWING NUMBER

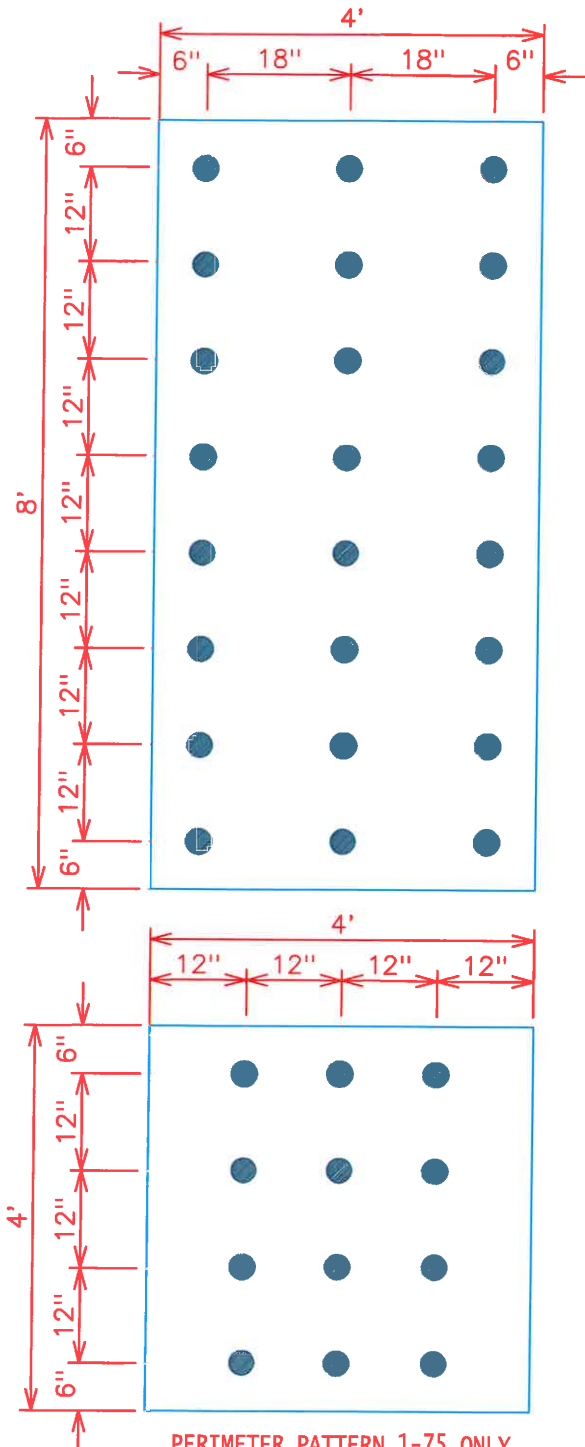
FTR-DE3





FIELD PATTERN 1-75 OR 1-90

4' X 8' = 16 PER BOARD  
4' X 4' = 8 PER BOARD



PERIMETER PATTERN 1-75 ONLY

4' X 8' = 24 PER BOARD  
4' X 4' = 12 PER BOARD

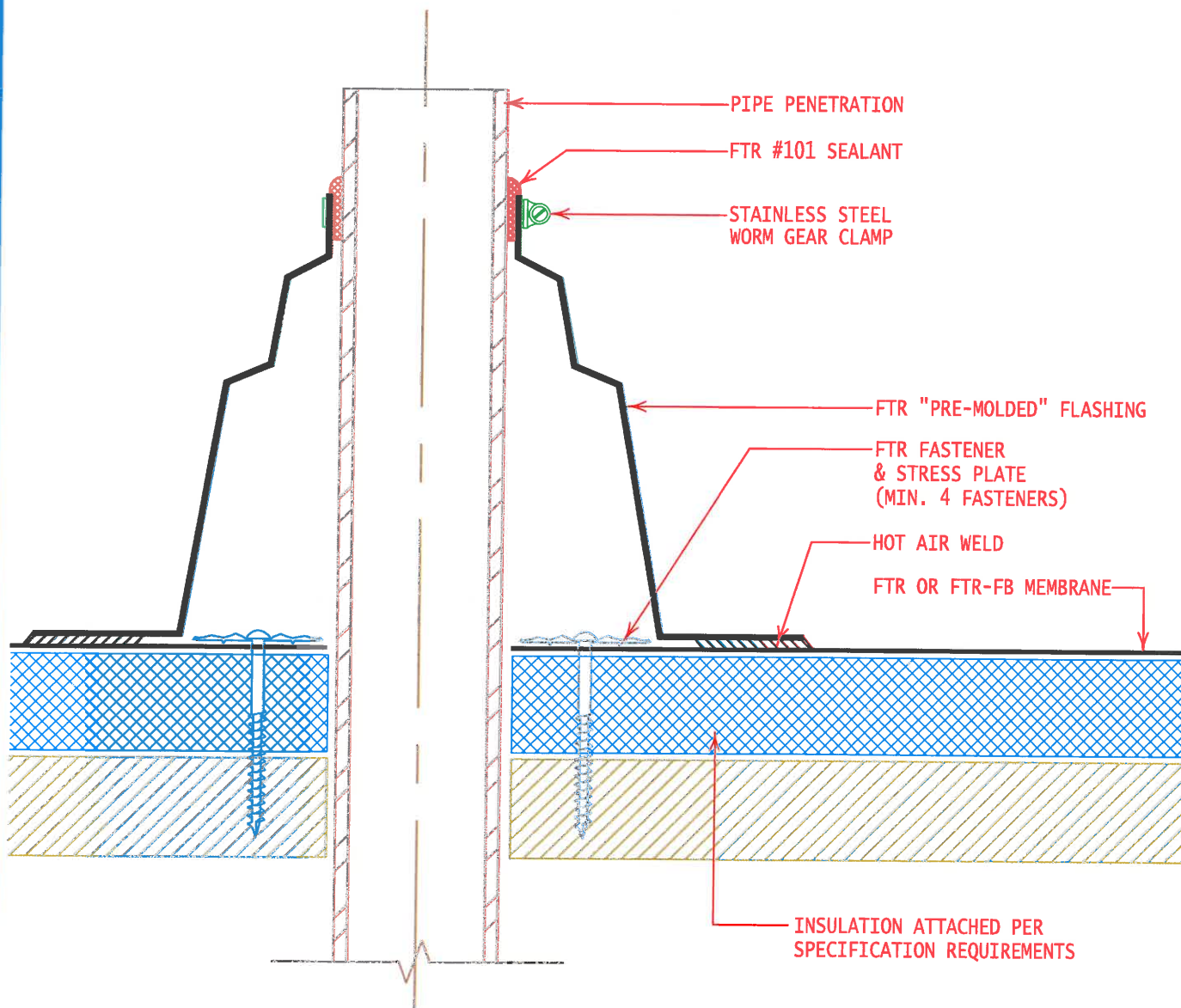


GENERAL REFERENCE:  
"FTR GS06"  
APPLICABLE SYSTEMS:  
"FTR AD06"

FULLY ADHERED SYSTEM  
MECHANICALLY ATTACHED INSULATION.  
INSULATION LESS THAN 1.5" THICKNESS

REVISES DETAIL	ISSUE DATE	DRAWING NUMBER
ALL PREVIOUS	03-01-07	FTR-DI3





GENERAL REFERENCE:

"FTR GS06"

APPLICABLE SYSTEMS:

"FTR MA06"

"FTR AD06"

"FTR BA06"

## PRE-MOLDED PIPE FLASHING

REVISES DETAIL

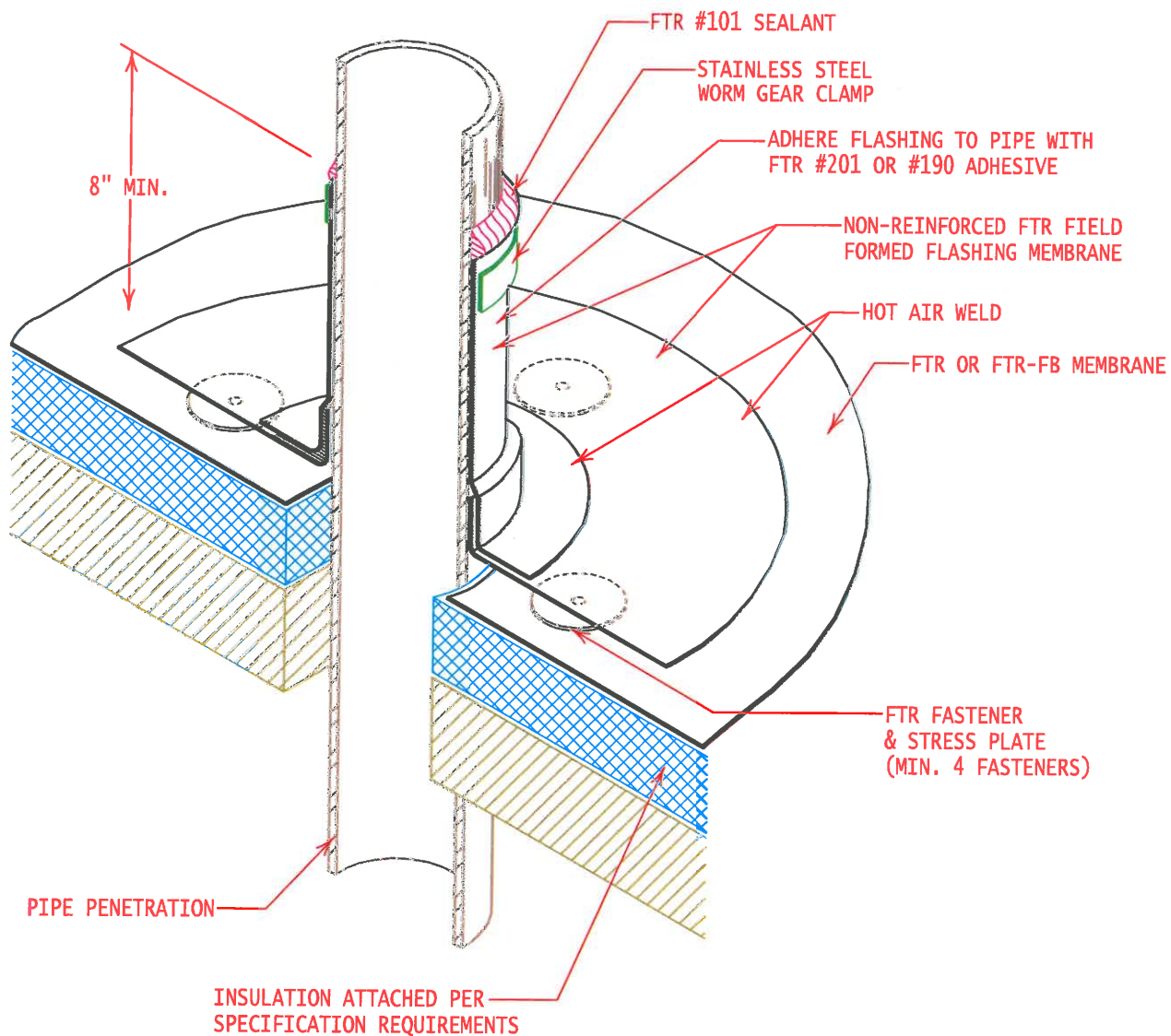
ALL PREVIOUS

ISSUE DATE

03-01-07

DRAWING NUMBER

FTR-DP3



**GENERAL REFERENCE:**

"FTR GS06"

**APPLICABLE SYSTEMS:**

"FTR MA06"

"FTR AD06"

"FTR BA06"

**FIELD FABRICATED PIPE FLASHING**

REVISES DETAIL

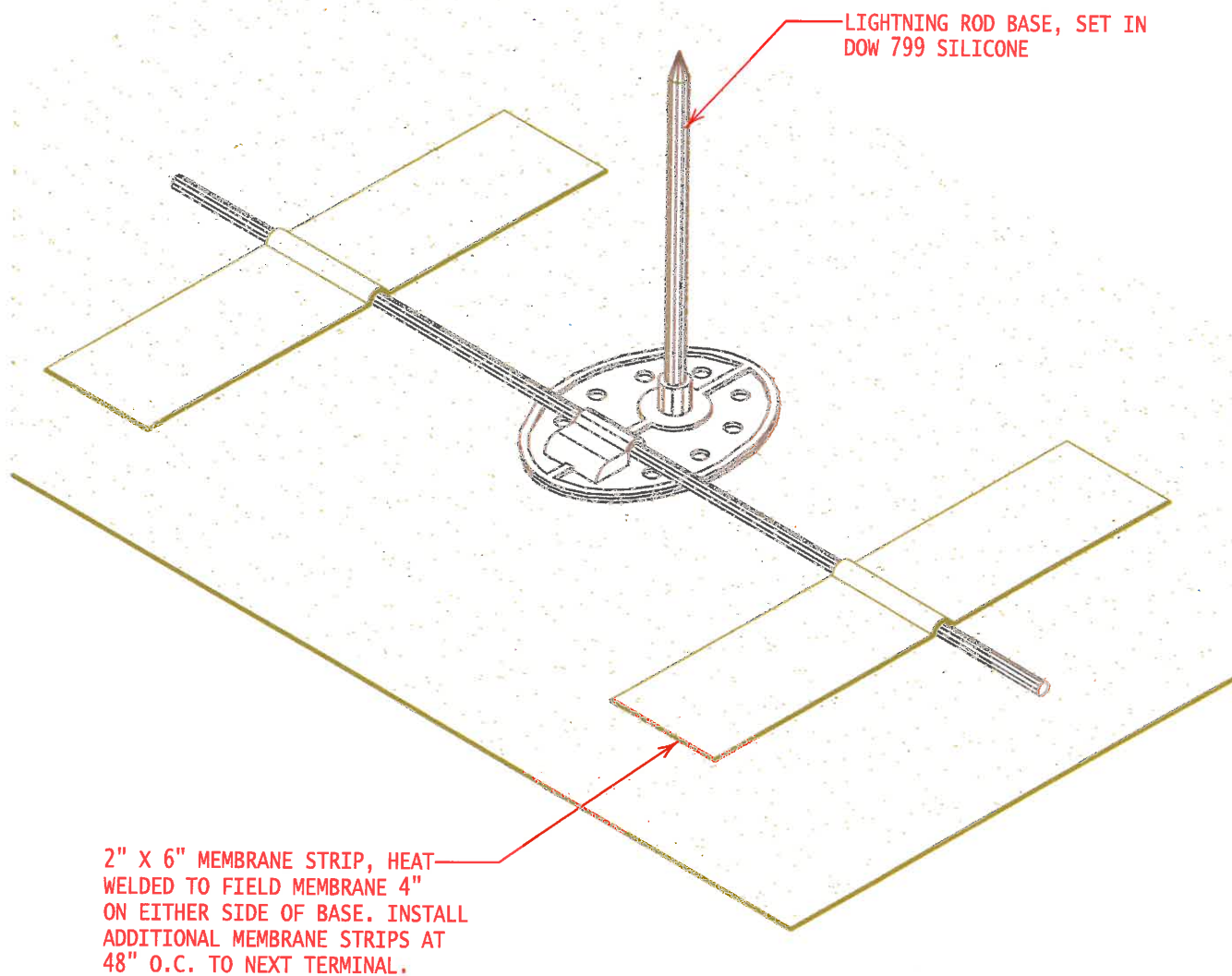
ISSUE DATE

DRAWING NUMBER

ALL PREVIOUS

03-01-07

FTR-DP41



GENERAL REFERENCE:

"FTR GS06"

APPLICABLE SYSTEMS:

"FTR MA06"

"FTR AD06"

"FTR BA06"

## LIGHTNING PROTECTION

REVISES DETAIL

ISSUE DATE

DRAWING NUMBER

ALL PREVIOUS

03-01-07

FTR-DM3

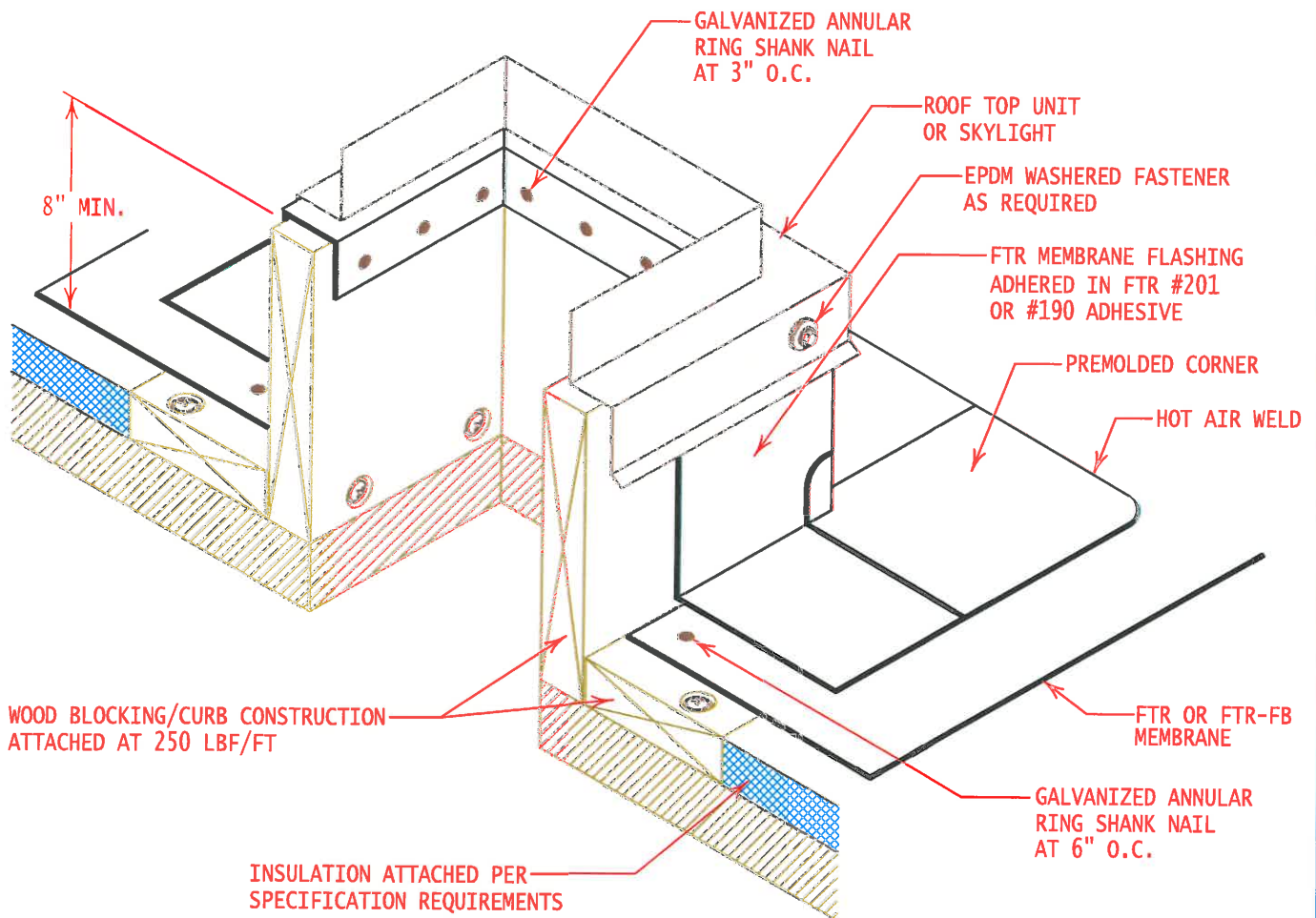
**NON-LIFTABLE**

FTR #101 SEALANT  
BEHIND TOP OF FLASHING

MECHANICAL UNIT

METAL COUNTERFLASHING, FASTEN W/  
EPDM WASHERED FASTENERS AT 12" O.C.

FTR FLASHING (FULLY ADHERED)



**GENERAL REFERENCE:**

"FTR GS06"

**APPLICABLE SYSTEMS:**

"FTR MA06"

"FTR AD06"

"FTR BA06"

**TYPICAL WOOD CURB  
OR SKYLIGHT FLASHING**

REVISES DETAIL

ALL PREVIOUS

ISSUE DATE

03-01-07

DRAWING NUMBER

FTR-DP11